The Impact of Female Director Representation on Corporate ESG Rating Performance: An Empirical Study

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Abstract. Enhancing the green transition of enterprises constitutes a pivotal endeavor for the salubrious advancement of the Chinese economy. The integration of Environmental, Social, and Governance (ESG) concepts, alongside progressively refined rating methodologies, furnish an imperative tool for corporations to implement initiatives within these domains. Additionally, this framework offers investors more robust quantitative data to inform their decisions. This study, pivoting on the governance influence of female board members, leverages ESG ratings from *SynTao Green* to scrutinize data from companies listed on the Chinese A-share market over the period of 2018-2022. Employing panel data regression analysis, this investigation seeks to discern the impact imparted by the proportion of female directors on ESG ratings, and empirically study the effects that the representation of female directors has on the performance of ESG ratings of enterprises, specifically considering the nature and age of the enterprises. The findings suggest that the proportion of female directors affects the ESG ratings of enterprises. Specifically, the higher the proportion of female directors, the better the ESG rating performance of the company. Nevertheless, the influence exerted by the type of enterprise and the company age on the magnitude of the impact attributable to female directorship does not prove to be statistically significant.

Keywords: The proportion of female directors; ESG ratings; *SynTao Green*; Panel regression analysis

1 Introduction

Amidst the mounting severity of ecological crises and an upsurge in natural calamities, there has emerged a collective cognizance regarding the imperative of ecological conservation. Environmental stewardship and societal accountability have now coalesced into a global human commitment. Presently, as China's economy transitions towards a phase characterized by elevated quality growth, there is not only a pursuit of economic velocity but also an emergent emphasis on the holistic enrichment of societal and ecological facets. This paradigm shift has been underscored in the pronouncements of the Chinese government, notably within the Report of the Twentieth National Congress of

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the Communist Party of China (2022), which predicates that high-quality development shall preside as the cornerstone in the nation-building agenda [1]. As the main micro subjects in economic development, enterprises bear social responsibilities such as environmental protection, and the corresponding environmental performance also affects the image and market value of enterprises, hence, environmental protection and social responsibility are gradually sinking from a macro issue to a task that must be paid attention to in corporate governance.

ESG is an acronym for Environment, Social and Governance, which is an investment concept and corporate evaluation standard focusing on environmental, social and governance performance (Gao, 2023) [2]. The ESG concept was first proposed in the report "Who Cares Wins" published by the United Nations Global Compact (*UNGC*) in June 2004, and then gradually became a comprehensive system for evaluating sustainable development and promoted worldwide under the joint promotion of relevant international organizations [3]. In fact, ESG ratings were comparatively late to be introduced to the Chinese market, with the inception of professional assessment frameworks and associated data being noted circa 2015. Subsequently, an increasing array of organizations commenced the undertaking of ESG evaluations for entities within China (Li & Li, 2024) [4]. Studies have shown that ESG performance has a significant impact on the quality of innovation, and ESG reputational risk closely influences firms' market valuation (Mandas et al., 2024) [5]. Despite the accelerated development of ESG initiatives within the Chinese context, the maturation of these frameworks remains nascent. Particularly, the ESG disclosure by listed companies is often characterized by deficiencies and inefficiencies. Therefore, using ESG ratings as a tool to explore how Chinese enterprises can improve their environmental, social, and governance performance is of great significance to the sound development of both the macroeconomy and the microeconomy.

As a major force in corporate internal governance and decision-making, directors play a central role in corporate behavioral orientation. In recent years, with the continuous improvement of women's education and social status, they have begun to play an important role in the daily operation and management of enterprises and major strategic decisions (Faccio et al., 2016) [6]. By the beginning of 2024, 97.0% of A-share listed companies have at least one female employee serving on the board of directors, supervisory board, or among the ranks of executives (Ibid). Currently, academics have different evaluations of the role played by female directors in corporate governance, with some studies suggesting that board gender diversity and female governance can reduce environmental violations (Liu, 2018) [7], and have a positive effect on shaping the image of environmentally friendly companies and enhancing corporate value (Yao, 2022) [8]; some studies also suggest that female executives can enhance the level of CSR information disclosure level (Huang & Zhou , 2015) [9]. Therefore, in this paper, when exploring how to enhance the performance of corporate ESG ratings, the proportion of the number of women in the board of directors is used as an explanatory variable to analyze its inner operation mechanism. Utilizing data from A-share companies listed on the Shanghai and Shenzhen stock exchanges from 2018 to 2022, this paper employs panel regression method to investigate the impact of the proportion of female directors on the ESG rating performance of enterprises, which holds significant theoretical and

practical value for enhancing Chinese firms' ESG performance, aligning with the broader objective of fostering the sustainable development of the micro-economy.

The possible research contributions of this paper lie in the following: firstly, this paper takes the ESG rating performance of enterprises as the explanatory variable, and explores the paths for enterprises to improve their ESG rating performance from the perspective of the role of female directors, which provides a behavioral grip for enterprises to improve their ESG-related work. Secondly, this paper attempts to fill this research gap by exploring the impact of the proportion of female directors on the ESG performance of companies through empirical research on the data of Chinese listed companies. At present, there is no lack of empirical research on the impact of female directors or gender diversity on ESG in the international arena, but there has not been a clear and unified conclusion, and most of the samples come from developed countries in Europe and the United States, while the research on the role of women in Asian countries is still missing. Gender issues in the Chinese context are more focused on corporate efficiency and financial performance, while research on ESG mainly focuses on using ESG performance as an explanatory variable to investigate the impact on corporate value and performance. There is a lack of research on the relationship between the proportion of female directors and ESG performance. As a representative developing country in Asia and the second largest economy in the world, China has been experiencing rapid microeconomic growth. Concurrently, the status of women within Chinese society has witnessed a significant elevation, with strides in gender equality that, whilst not on par with Europe and North America, are commendable in comparison to many of its Asian counterparts. The influence wielded by female executives within Chinese enterprises is a phenomenon that merits attentive scrutiny due to its potential implications for broader socio-economic dynamics. In this context, an empirical study into the correlation between the presence of female directors and the ESG rating performance of Chinese firms assumes critical importance. Such a study could elucidate the extent to which gender diversity in corporate leadership can serve as a bellwether for ESG outcomes and, by extension, inform strategies for sustainable economic development. Moreover, the insights derived from this analysis may offer valuable lessons for other developing nations in Asia and beyond, thus contributing to the amelioration of corporate governance and the promotion of inclusive growth on a more expansive scale.

2 Rational and Research Hypotheses

According to Gender socialization theory, women are socialized to adopt roles that emphasize gentleness, tolerance, and altruism, in contrast to men's socialization towards aggression and profit-maximization (Carlson, 1972; Gilligan, 1977; Adams et al., 2011) [10][11][12]. This dichotomy in gendered social roles is purportedly more pronounced within the context of Chinese society. Therefore, in the process of corporate governance, female directors' decisions may be slightly less profit-seeking and more concerned with corporate behaviors that have externalities and practices that enhance corporate reputation. Thus, it can be assumed that female directors will pay more attention

to environmental protection, social responsibility and humanistic care in corporate management when exercising their decision-making power.

Nonetheless, the capacity of female directors to actualize their roles in environmental, social and governance domains is potentially impeded by a variety of determinants. Empirical evidence suggests that the characteristics of the corporation, including its size, nature, and age, are intricately associated with the degree to which female directors could exert consequential influence within the corporate governance structure.

State-owned enterprises shoulder the role of transmitting national policies and taking the lead in social winds, and in recent years, gender equality has also gradually developed into an important indicator for measuring the degree of humanization of enterprises and their awareness of social responsibility. According to the legitimacy theory, if an organization wants to survive and develop in the social environment, its behaviors need to be in line with the prevailing norms and values of the society, and has legitimacy (Suchman, 1969) [13]. Many state-owned enterprises, in order to cater to the mainstream values of society and show the company's gender equality and humanistic care, may deliberately arrange female positions in the board of directors and other important positions, but these positions are often just a "vase" with no real roles, and female directors cannot really play a role in decision-making; in contrast, the policy-driven nature of non-state-owned enterprises is not the same as that of non-state-owned enterprises. Non-state-owned enterprises are less policy-driven and less socially responsible, and their focus is on improving corporate efficiency, so the recruitment of female directors for cosmetic purposes is less frequent, and female directors are often able to play a more practical decision-making role in their positions.

The age of the firm may also have an impact on the power of female directors in ESG-related decision-making. According to the enterprise life cycle theory, enterprises face different external environment and internal resources, organizational forms, etc. at each stage, and thus change their behavior (Dickinson,2011) [14]. In the nascent phase of development, firms often prioritize rapid expansion and profit maximization, which may lead to a neglect of actions with positive externalities, such as environmental stewardship and social responsibility, so as to enhance their economic growth rates. However, young enterprises need to create a good corporate image to attract investment for scale expansion, and thus are more likely to hire female directors to show the company's humanistic concern, but such appointments are frequently symbolic, lacking substantive engagement in ESG initiatives. As firms transition into the maturity stage, there is a shift towards sustainable and reputable long-term trajectories. The importance of a firm's reputation and its externalities becomes increasingly paramount, prompting a strategic refocus on ESG concerns. In this context, female directors, who are often perceived as being particularly effective in this domain, may gain greater influence and have a more pronounced impact on enhancing the firm's ESG ratings. Based on the above analysis, the following hypotheses are proposed:

H1: Ceteris paribus, there is a positive association between the proportion of female directors on a firm's board and the firm's ESG rating performance.

H2: The positive impact of an increased proportion of female directors on a firm's ESG performance is more substantial in non-state-owned enterprises compared to state-owned firms.

H3: The enhancement of a firm's ESG performance attributable to a greater proportion of female directors is more pronounced in firms with a longer organizational history as opposed to those in the earlier stages of their corporate life cycle.

3 Empirical Tests

3.1 Sample Selection and Data Sources

This paper selects the annual financial report data of A-share listed companies in Shanghai, Shenzhen and Beijing from 2018 to 2022 as the initial sample, and the data were mainly sourced from the Choice financial data terminal.

In order to ensure the reliability of the research results, the initial sample was screened as follows: (1) samples with missing data for the variables were excluded; (2) financial listed companies were excluded, and real estate listed companies were excluded at the same time due to the fact that China's real estate industry carries financial attributes. The data for the remaining 650 sets of sample firms after removing missing data for the variables and excluding firms in the financial and real estate industries totaled 2,492 observations. To prevent sample selection bias, the missing values of ESG ratings in some years are retained to allow for panel imbalance.

3.2 Variable Definitions and Measurement

3.2.1 Explained Variable - ESG Rating from SynTao Green

SynTao Green is the earliest organization in China to release ESG rating data, and the first service organization in China to sign the United Nations Principles for Responsible Investment (*UNPRI*). The ESG Rating Analysis Report of A-share listed companies released by *SynTao Green* has attracted widespread attention in the capital market and has high authority, and many papers on ESG-related topics of Chinese enterprises have adopted *SynTao Green*'s data as the ESG rating data source (Liu & Lu, 2023; Zhao & Li, 2024) [15][16]. Given the extensive and authoritative nature of *SynTao Green*'s ESG ratings, coupled with their coverage of the most representative listed companies within the Chinese market, this study has elected to utilize the annual ESG rating data provided by *SynTao Green* for A-share listed companies spanning the years 2018 to 2022 as the initial dataset.

The ESG assessment conducted by *SynTao Green* results in a spectrum of categorical ratings represented by seven distinct grades: C, C+, B-, B, B+, A- and A. These grades, ranging from C (indicative of the lowest performance tier) to A (reflecting the highest echelon of ESG accomplishment), are systematically arranged in an ordinal hierarchy with corresponding numerical values from 1 to 7.

3.2.2 Explanatory Variable - Percentage of Female Company Directors

In this paper, information on the gender of board members was obtained from the Cathay Pacific *CSMAR* database, and the percentage of female members (*FP*) on the

board of directors of each listed firm was calculated for each year. To avoid endogeneity problems, the variable *FP* was lagged by one period for each year in this paper.

This paper also refers to the research experience in Zhao & Li's study (2024) [16], controlling for other factors that may affect corporate environmental governance and social responsibility behavior by adding firm size *(MCAP*), leverage ratio (*LEV*), return on equity *(ROE*), level of research and development (*RD*), cash ratio (*CASH*), the ratio of market value of a firm's assets to its Replacement Value Ratio (*TOBINQ*), and CEO Gender (*CEO*).

In order to avoid the impact of extreme values on the regression results, several variables, *MCAP*, *LEV*, *ROE*, *CASH*, and *TOBINQ*, were subjected to shrinking of the extreme values at the 1% and 99% quantiles. Moreover, the natural logarithmic transformation was applied to firm size (*MCAP*) in the regression

3.3 Empirical Modelling

Based on the research hypotheses established above, a multiple regression model was developed to test the impact of the percentage of female directors on the performance of the company's ESG rating score, with the following regression formula:

$$SDRLESG = \beta_0 + \beta_1 FP_{i,t-1} + \gamma * ControlVari_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

Where *SDRLESG* is the ESG rating of the *SynTao Green* and *FP* is the percentage of women on the board of directors of the enterprises.

4 Findings and Analyses

4.1 Descriptive Statistics

Descriptive statistics were analyzed to count the basic descriptive characteristics of the variables. Table 1 shows the results of descriptive statistics for the main variables.

Table 1. Results of descriptive statistics

Var_Name	Obs	Mean	SD	Min	Median	Max
ESG	2492	3.457	1.052	1.000	3.000	7.000
FP	3250	0.146	0.129	0.000	0.111	0.778
MCAP	3250	416.794	947.379	16.405	205.038	25752.055
LEV	3250	45.260	18.806	1.427	46.139	119.493
ROE	3250	10.489	22.779	-416.160	10.434	577.792
RD	3250	4.501	5.619	0.000	3.305	76.350
CASH	3250	0.840	1.346	0.009	0.460	28.839
TOBINQ	3250	2.249	2.185	0.688	1.547	29.167
CEO	3250	0.061	0.239	0.000	0.000	1.000

4.2 Correlation Analysis

To preliminarily determine whether there is a large correlation between the respective variables, so as not to have a covariance effect on the regression analysis, a correlation analysis was conducted. The results present that: (1) the correlation coefficient between the proportion of female directors and the ESG rating of enterprises is positive, which initially indicates that the increase in the proportion of female directors has a facilitating effect on the improvement of the ESG performance of enterprises, which is consistent with the hypotheses; (2) the absolute values of correlation coefficients between the respective variables are all lower than 0.7, and at the same time the test obtains the VIF values of the various control variables are less than 10, so that there is no significant covariation, and all variables can be retained.

4.3 Panel Regression Analysis

Based on the research hypotheses above, separate tests are conducted for the full sample, the SOE and non-SOE samples, and the old and new firm samples (equated by age of all firms in the sample at the median), with the model controlling for industry and year fixed effects and individual random effects. Table 2 presents the main multiple regression results.

Table 2. Regression results of hypothesis testing

	Full sample		**State-owned enterprises**		**Non-state-owned enterprises**		**Old enterprises**		**New enterprises**	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
FP	0.478***	0.655***	0.535*	0.723**	0.598**	0.744***	0.432	0.568**	0.625**	0.738***
MCAP		0.391***		0.368***		0.419***		0.389***		0.358***
LEV		0.004**		0.000		0.007***		0.001		0.008***
ROE		-0.005***		-0.005		-0.004*		-0.009***		-0.000
RD		0.005		0.013		0.006		0.018**		-0.001
CASH		-0.004		0.025		-0.023		0.041		-0.016
TOBINQ		-0.593***		-0.086***		-0.048***		-0.065***		-0.055***
CEO		-0.020		-0.017		0.009		-0.020		0.007

Adj_R^2	0.252	0.263	0.210	0.225	0.292	0.292	0.221	0.239	0.292	0.294
N	2492	2492	1138	1138	1354	1354	1308	1308	1184	1184

Note: The data in the table are the regression coefficients of the variables, ***, ** and * indicate that they are significant at the 1 per cent, 5 per cent and 10 per cent level of significance, respectively.

From the regression results from the full sample, we can see that column (a) shows that the coefficient of the percentage of female board members is positive and significant at the 1% significance level. This suggests that an increase in the percentage of female board members promotes higher corporate ESG rating performance, i.e., women play a role in corporate decision-making by taking advantage of their greater focus on community development and greater concern for other people and environmental issues, and improve corporate performance on environmental care and social responsibility. Column (b) shows that after adding the control variables, the coefficient of the number of female directors remains positive and significant at the 1% significance level, proving that hypothesis H1 holds.

Comparing the regression results for the samples of SOEs and non-SOEs, it can be seen that: column (a) for SOEs shows that the coefficient of female directorships in SOEs is significant at the 10 per cent significance level; and column (b) shows that the coefficient of female directorships in SOEs is positive and significant at the 5 per cent significance level with the inclusion of the control variable. Column (a) in non-state-owned enterprises shows that the *FP* coefficient is positive and significant at the 5% significance level; while column (b) shows that the coefficient is still positive and significant at the 1% significance level after the inclusion of the control variables. However, it is still not possible to judge whether there is a significant difference between the coefficients of *FP* in the two group regression, so the cross term was introduced to carry out the significance test of the difference between the coefficients of the group regression, and the regression results show that the coefficients of *FP* do not have a significant difference between the two groups of state-owned enterprises and non-state-owned enterprises, which proves that the hypothesis H2 does not hold.

Comparing the regression results for the sample of old and new firms, it indicates that: column (a) for old firms shows the *FP* coefficient in old firms is insignificant; however, column (b) shows that it is positive and significant at the 5 percent significance level after the inclusion of the control variable. Column (a) for new firms shows that the *FP* coefficient in new firms is positive and significant at the 5 per cent level of significance, and column (b) shows that it remains positive and significant at the 1 percent level of significance with the inclusion of the control variable. As with the previous group-based regression, the inability to directly infer significant differences between the *FP* coefficients for old and new firms necessitates the introduction of an interaction term to test for significant intergroup coefficient variation. The regression results indicate no significant difference in the *FP* coefficient between the groups of old and new firms, thus disproving hypothesis H3.

5 Summary

Based on the data of Chinese A-share listed companies from 2018-2022, this paper explores the relationship between ESG rating performance and the proportion of female board members in major Chinese listed companies, and compares this relationship in state-owned and non-state-owned enterprises, and in old and new enterprises. To summarize, the following conclusions can be obtained.

An increase in the proportion of female directors contributes to an increase in the performance of corporate ESG ratings. The possible explanation for this is that female directors have a more altruistic behavioral style than male directors, and pay much attention to the externalities of the company's behavior, thus giving more consideration to environmental protection, social responsibility and scientific corporate governance in their decision-making; at the same time, female directors are more concerned about the reputation and sound development of the company, and have less tolerance for risk, thus focusing on the construction of ESG ratings to improve the performance of the company.

The increase in the proportion of female directors promotes the performance of ESG ratings of SOEs and non-SOEs, but there is no significant difference in the promotion effect for both. This disproves the hypothesis derived from the legitimacy theory, suggesting that Chinese firms do not differ in the voice of female directors because of the nature of the firms they belong to, and that female directors can make effective decisions in both SOEs and NSOEs and play their roles in ESG-related work.

The increase in the proportion of female directors contributes to the ESG ratings for both old and new enterprises, but there is no significant difference in the contribution to the performance of the two. This may be due to the fact that in order to pursue sound and long-term development, old enterprises strengthen environmental protection, social responsibility and optimize internal governance, while in the early stage of development, in order to expand and attract investment and financing, new enterprises also need to improve their corporate reputation and build a good image, and thus attach equal importance to ESG-related work. Therefore, both old and new enterprises should give sufficient space for female directors to play their role in order to improve ESG ratings.

Combining the findings and China’s real situation, the following policy insights can be drawn. Firstly, formulate relevant laws and regulations to guarantee equal employment opportunities for female employees and the voice of female directors, and to endeavor to eliminate gender discrimination and the role of the vase in the exercise of power in employment opportunities and in the workplace are necessary.

Secondly, the country should encourage industries and enterprises with serious pollution or governance problems to hire more female directors by means of subsidies, so as to improve the enterprises' ability to deal with ESG-related issues, and at the same time do a good job of monitoring the process and preventing fraudulent subsidies.

Thirdly, the country should urge investors and financiers to jointly focus on ESG rating indicators and find ways to improve them by, among other things, hiring more female directors. While rating agencies should formulate more detailed and scientific

evaluation criteria, and to truly turn the actions taken in order to cater to the evaluation criteria into beneficial work.

In addition, the research in this paper is also of considerable significance in the international context, especially in the Asian context. The topic of women's status and ESG enhancement is not only an economic indicator, but also involves the cultural and social division of labor in the country. As China is an East Asian country and the world's largest developing country where women's status is rising extremely fast, the results of this empirical study also provide an important basis for the actions of neighboring Asian countries in promoting women's workplace status enhancement for better ESG performance.

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